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ACCUMULATION OF CHLORHEXIDINE DIGLUCONATE (CDG) IN LENSES

Ex	CDG Accumulated (μg./days)	Total Volume (ml.)	Rejuvenating Solution Surfactant	Resin	Salt
16	2179/29	10	TWEEN 81 (2%)	DOWEX 50 W-X8 (1.0 g)	NaCl (0.9%)
17	1875/28	10	TWEEN 20 (2%)	DOWEX 50 X-X8 (1.0 g)	KCl (0.9%)
18	2145/30	10	TWEEN 10 (2%)	DOWEX 50 W-X8 (1.0 g)	KCl/ NaCl 50/50 (0.9%)

In Examples 9–18, the solutions are effective to remove large quantities of the preserving agent.

EXAMPLE 19

Crofilcon A hydrogel contact lenses are treated with a BOIL N SOAK solution Burton Parsons, Inc. containing thimerosal according to Preparation 1, and about 5 μg of thimerosal is retained as measured by atomic adsorption spectroscopy. Each lens is then placed in 10 ml of a solution containing 3% TWEEN 20 solution in 0.9% saline and 1.0 g of DOWEX 1-X10 anion ion exchange resin for 20 hours. The thimerosal remaining is about 10 percent of the original concentration as measured by atomic adsorption spectroscopy.

EXAMPLE 20

Crofilcon A hydrogel contact lenses are treated with a FLEXCARE solution from Burton Parsons Co. Inc. as described in Preparation 1. About 2900 μg of chlorhexidine and 2 μg of thimerosal are adsorbed as measured by ultraviolet and atomic adsorption spectroscopy, respectively. The lenses are placed in 20 ml of a solution containing 3% of TWEEN 20, 1 g of DOWEX 50 W-X8, and 1 g of Bio-Rad Analytical Grade AG 1-X4 as a 0.9% saline solution for 20 hours. The remaining chlorhexidene and thimerosal are about 11% and 9% respectively by analysis as described above in this example. After the normal cleaning and disinfecting procedure, these lenses do not create irritation when placed on a rabbit eye for 8-hour periods.

While the present invention has been described with reference to the specific embodiments thereof, it should be understood by those skilled in this art that various changes may be made and equivalents may be substituted without departing from the true spirit and scope of the invention. In addition, many modifications may be made to adopt a particular situation, material, or composition of matter, process, process step or steps, or the present objective to the spirit of this invention without departing from its essential teachings.

What is claimed:

1. An aqueous contact lens solution for removing adsorbed and occluded chemical and biological agents from a contact lens in need of rejuvenation which comprises:

(a) a nonionic surfactant;

(b) (i) a cationic ion exchange resin,

(ii) an anionic ion exchange resin or

(iii) mixtures of (i) and (ii);

(c) water; and optionally

(d) an ophthalmologically suitable salt.

2. The contact lens solution of claim **1** wherein said ion exchange resin is a cationic ion exchange resin.

3. The contact lens solution of claim **2** wherein said suitable salt comprises an alkali metal or alkaline earth metal halide salt.

4. The contact lens solution of claim **3** wherein said alkali metal halide salt is selected from the group consisting of sodium chloride, sodium bromide, potassium chloride, and potassium bromide and mixtures thereof.

5. The contact lens solution of claim **2** wherein said salt is present in an amount of 0.1 to 10 percent by weight.

6. The contact lens solution of claim **5** wherein said salt comprises about 0.9 percent by weight of sodium chloride.

7. The contact lens solution of claim **2** wherein

(a) said surfactant is present in an amount of about 0.1 to 10 percent by weight;

(b) said resin is present in an amount of about 0.1 to 50 percent by weight; and P1 (c) water in a quantity sufficient to bring the solution to 100 percent by weight.

8. The contact lens solution of of claim **2** wherein

(a) said surfactant is a polyoxyethylenated long-chain carboxylic acid ester of sorbitol, sorbitan or sorbide, or mixtures of said esters; and

(b) said resin is a nuclear sulfonated copolymer comprised of styrene and divinylbenzene.

9. The contact lens solution of claim **2** wherein

(a) said surfactant is a polyoxyethylenated sorbitan monolaurate containing about twenty moles of ethylene oxide; and

(b) said resin is a nuclear sulfonated copolymer of about 92 percent styrene and other monovinyl monomers, and about 8 percent divinylbenzene.

10. The contact lens solution of claim **2** wherein

(a) said surfactant is present in about 0.5 to 5 percent by weight;

(b) said resin is present in about 1 to 20 percent by weight; and

(c) in a quantity sufficient to bring the solution to 100 percent by weight.

11. The contact lens solution of claim **2** wherein

(a) said surfactant is present in about 1 to 3 percent by weight;

(b) said resin is present in about 5 to 15 percent by weight; and

(c) water in a quantity sufficient to bring the solution to 100 percent by weight.

12. The contact lens solution of claim **10** wherein

(a) said surfactant is a polyoxyethylenated sorbitan monolaurate containing about twenty moles of ethylene oxide which is present in about 2 percent by weight; and

(b) said resin is a nuclear sulfonated copolymer of about 92 percent styrene and other monovinyl monomers and about 8 percent divinyl benzene which is present in an amount of about 10% by weight.

13. The process of rejuvenating a contact lens which comprises contacting a lens in need of rejuvenating with the contact lens solution of claim **2**.

14. The process for preparing the contact lens solution of claim **2** which comprises:

(a) mixing said surfactant with said resin(s) at ambient temperature; and

(b) diluting said mixture to the desired concentration by the addition of water.